Electromagnetic Engineering (EC21006)
Mid term examination

Full Marks – 45
Time – 2 hrs

Answer all questions. The marks for the individual parts of a question are indicated on the right.

1. An electric field described by $\vec{E} = 20\sin\left(10^8 t - \beta z\right)\hat{a}_y \quad V/m$ exists in a medium with media parameters $\varepsilon = \varepsilon_0$, $\mu = \mu_0$ and $\sigma = 0$. For the above condition, calculate the value of β. Also, write down the expression of the magnetic field $\vec{H}$. (12 + 4)

2. A magnetic field given by $\vec{H} = 4\sin\left(10^6 t - 0.01z\right)\hat{a}_y \quad A/m$ exists in a medium with media parameters $\varepsilon = \varepsilon_0$ and $\sigma = 0$. Find the relative permeability of the medium. (12)

3. State and derive the transmission line equations governing the spatial and temporal variation of voltage and current waves in a transmission line. (12 + 5)